

**PATENT**

Attorney Docket No. SPO-587/DIV

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:	)	Group Art Unit: 1626
	)	
MOMODA; MATSUOKA; NAGOU	)	Examiner: A. SMALL
	)	
Serial No. unknown	)	
	)	
Filed: February 19, 2002	)	

For: **CHROMENE COMPOUNDS**

**PRELIMINARY AMENDMENT**

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Preliminary to examination, please amend the herewith filed application as indicated in Appendices A, B, C, and D.

**REMARKS**

Entry of the indicated amendments prior to examination is respectfully requested in view of the following comments.


Claims 9-26 of the parent application, serial no. 09/762,112 of the presently captioned application was subject to a Restriction requirement. Accordingly, claims 1-8 of the presently pending application have been amended to incorporate the limitations of non-elected 9-26 claims and new claims 9-18 have been added. No new matter within the meaning of §132 has been added.

Applicants respectfully submit that the application is now in

condition for allowance and request favorable action on the merits.

Respectfully submitted,

**SHERMAN & SHALLOWAY**

  
Agent for Applicants  
Roger C. Hahn  
Reg. No. 46,376

February 19, 2002

**SHERMAN AND SHALLOWAY**

P.O. Box 788  
Alexandria, Virginia 22313  
(703) 549-2282

JC13 Rec'd PCT/PTO 19 FEB 2002

PATENT

Attorney Docket No. SPO-587/DIV

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

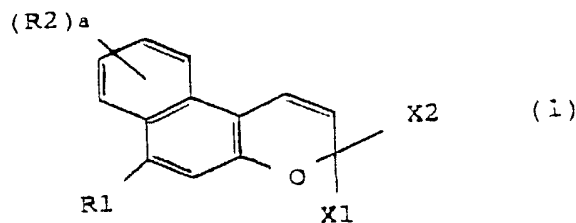
In re Application of:	)	Group Art Unit: 1626
	)	
MOMODA; MATSUOKA; NAGOU	)	Examiner: A. SMALL
	)	
Serial No. unknown	)	
	)	
Filed: February 19, 2002	)	

For: CHROMENE COMPOUNDS

Appendix A

Please amend the following claims as indicated in the following marked-up copy of the claims.

1. (Once Amended) A photochromic material containing a chromene compound represented by the following general formula (1),



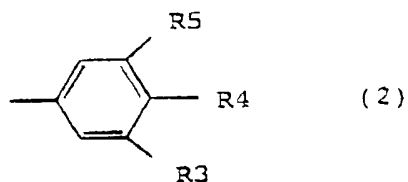
wherein R1 is a substituted amino group, a substituted or unsubstituted heterocyclic group having a nitrogen atom, as a hetero atom, bonded to a naphthopyran ring or a condensed heterocyclic group in which said heterocyclic group is condensed

with an aromatic hydrocarbon ring or an aromatic heterocyclic ring,

R<sub>2</sub> is an alkyl group, an alkoxyl group, an aralkoxyl group, an aralkyl group, a substituted amino group, a cyano group, a substituted or unsubstituted aryl group, a halogen atom, a substituted or unsubstituted heterocyclic group having, as a hetero atom, a nitrogen atom, bonded to the naphthopyran ring, or a condensed heterocyclic group in which said heterocyclic group is condensed with an aromatic hydrocarbon ring or an aromatic heterocyclic ring,

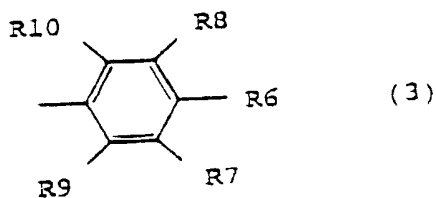
"a" is an integer of 0 to 3,

X<sub>1</sub> is a group represented by the following formula (2),



wherein each of R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> is a hydrogen atom, a substituted amino group, a substituted or unsubstituted heterocyclic group having a nitrogen atom, as a hetero atom, bonded to a benzene ring, or a condensed heterocyclic group in which said heterocyclic group is condensed with an aromatic hydrocarbon ring or an aromatic heterocyclic ring, but R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are not hydrogen atoms simultaneously, and

X2 is a group represented by the following formula (3),



wherein R6 is a hydrogen atom; an electron attractive group selected from the group consisting of a trifluoromethyl group, a trifluoromethoxy group, a cyano group, a sulfonyl group, an alkylsulfonyl group, an arylsulfonyl group and a nitro group; or an alkoxyl group,

each of R7 and R8 is (i) a hydrogen atom, an aliphatic hydrocarbon group having not less than three carbon atoms, a halogen atom, a trifluoromethyl group, a trifluoromethoxy group, a cyano group, a sulfonyl group, an alkylsulfonyl group an arylsulfonyl group or a nitro group when R6 is not a hydrogen atom, or (ii) a hydrogen atom, a halogen atom, a trifluoromethyl group or a trifluoromethoxy group when R6 is a hydrogen atom,

each of R9 and R10 is a hydrogen atom a cyano group, an alkoxyl group having 1 to 5 carbon atoms, a fluorine atom or a chlorine atom,

wherein, when R4 in the group represented by the above formula (2) is the substituted amino group, the substituted or unsubstituted heterocyclic group or is the condensed

heterocyclic group, R6 is not an alkoxyl group, and R6, R7, R8, R9 and R10 are not hydrogen atoms simultaneously.

2. (Once Amended) A photochromic material containing the chromene compound [according to] of claim 1, wherein in the group represented by the formula (3) in the above general formula (1):

R6, R7, R8, R9 and R10 are not hydrogen atoms simultaneously,

R6 is a hydrogen atom or an electron attractive group selected from the group consisting of a trifluoromethyl group, a cyano group, a sulfonyl group, an alkylsulfonyl group, an arylsulfonyl group and a nitro group,

when R6 is not a hydrogen atom, each of R7 and R8 is a hydrogen atom, an aliphatic hydrocarbon group having not less than 3 carbon atoms, a fluorine atom, a trifluoromethyl group, a cyano group, a sulfonyl group, an alkylsulfonyl group, an arylsulfonyl group or a nitro group, and

when R6 is a hydrogen atom, each of R7 and R8 is a hydrogen atom.

3. (Once Amended) A photochromic material containing the chromene compound [according to] of claim 1 wherein in the group represented by the formula (3) in the above general formula (1):

R6 is a hydrogen atom, an alkoxyl group or a trifluoromethoxy group,

each of R7 and R8 is a hydrogen atom, a halogen atom, a trifluoromethyl group or a trifluoromethoxy group[[]], wherein both R7 and R8 are not hydrogen atoms, when R4 in formula (2) in the general formula (1) is the substituted amino group the substituted or unsubstituted heterocyclic group[[]], or the condensed heterocyclic group, and

both R9 and R10 are hydrogen atoms.

4. (Once Amended) A photochromic optical material containing the [a] chromene compound of [any one of claims] claim 1 [to 3].

5. (Once Amended) A photochromic optical material containing the [a] chromene compound of [any one of claims] claim 1 [to 3].

6. (Once Amended) A photochromic [polymerizable composition] optical material containing the [a] chromene compound of [any one of claims 1 to] claim 3 [and a polymerizable monomer].

7. (Once Amended) A photochromic polymerizable

composition [according to claim 6, further comprising a polymerization initiator] containing the chromene compound of claim 1 and a polymerizable monomer.

8. (Once Amended) A photochromic polymerizable composition [according to claim 6 or 7, wherein the] containing the chromene compound of claim 2 and a polymerizable monomer is a (meth)acrylic acid ester compound.

9. (New) A photochromic polymerizable composition containing the chromene compound of claim 3 and a polymerizable monomer.

10. (New) The photochromic polymerizable composition of claim 7, further containing a polymerization initiator.

11. (New) The photochromic polymerizable composition of claim 8, further containing a polymerization initiator.

12. (New) The photochromic polymerizable composition of claim 9, further containing a polymerization initiator.



13. (New) The photochromic polymerizable composition of claim 7, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

14. (New) The photochromic polymerizable composition of claim 8, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

15. (New) The photochromic polymerizable composition of claim 9, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

16. (New) The photochromic polymerizable composition of claim 10, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

17. (New) The photochromic polymerizable composition of claim 11, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

18. (New) The photochromic polymerizable composition of claim 12, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

PATENT

Attorney Docket No. SPO-587/DIV

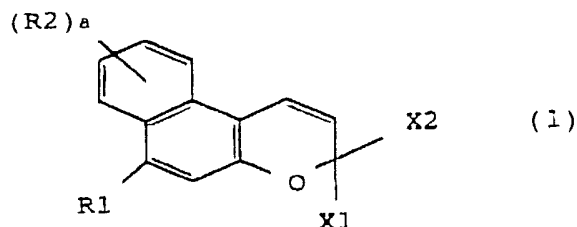
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: ) Group Art Unit: 1626  
 )  
 MOMODA; MATSUOKA; NAGOU ) Examiner: A. SMALL  
 )  
 Serial No. unknown )  
 )  
 Filed: February 19, 2002 )  
 )  
 For: CHROMENE COMPOUNDS

Appendix B

Please amend the following claims as indicated in the following clean copy of the claims.

1. (Once Amended) A photochromic material containing a chromene compound represented by the following general formula (1),



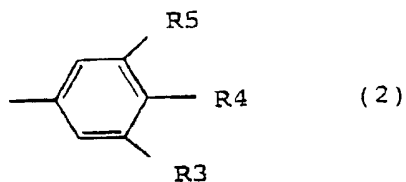
wherein R1 is a substituted amino group, a substituted or unsubstituted heterocyclic group having a nitrogen atom, as a hetero atom, bonded to a naphthopyran ring or a condensed heterocyclic group in which said heterocyclic group is condensed

with an aromatic hydrocarbon ring or an aromatic heterocyclic ring,

R2 is an alkyl group, an alkoxyl group, an aralkoxyl group, an aralkyl group, a substituted amino group, a cyano group, a substituted or unsubstituted aryl group, a halogen atom, a substituted or unsubstituted heterocyclic group having, as a hetero atom, a nitrogen atom, bonded to the naphthopyran ring, or a condensed heterocyclic group in which said heterocyclic group is condensed with an aromatic hydrocarbon ring or an aromatic heterocyclic ring,

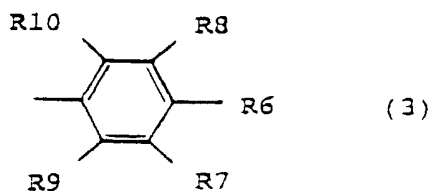
"a" is an integer of 0 to 3,

X1 is a group represented by the following formula (2),



wherein each of R3, R4 and R5 is a hydrogen atom, a substituted amino group, a substituted or unsubstituted heterocyclic group having a nitrogen atom, as a hetero atom, bonded to a benzene ring, or a condensed heterocyclic group in which said heterocyclic group is condensed with an aromatic hydrocarbon ring or an aromatic heterocyclic ring, but R3, R4 and R5 are not hydrogen atoms simultaneously, and

$X_2$  is a group represented by the following formula (3),



wherein R6 is a hydrogen atom; an electron attractive group selected from the group consisting of a trifluoromethyl group, a trifluoromethoxy group, a cyano group, a sulfonyl group, an alkylsulfonyl group, an arylsulfonyl group and a nitro group; or an alkoxyl group,

each of R7 and R8 is (i) a hydrogen atom, an aliphatic hydrocarbon group having not less than three carbon atoms, a halogen atom, a trifluoromethyl group, a trifluoromethoxy group, a cyano group, a sulfonyl group, an alkylsulfonyl group, an arylsulfonyl group or a nitro group when R6 is not a hydrogen atom, or (ii) a hydrogen atom, a halogen atom, a trifluoromethyl group or a trifluoromethoxy group when R6 is a hydrogen atom,

each of R9 and R10 is a hydrogen atom, a cyano group, an alkoxy group having 1 to 5 carbon atoms, a fluorine atom or a chlorine atom,

wherein, when R4 in the group represented by the above formula (2) is the substituted amino group, the substituted or unsubstituted heterocyclic group or is the condensed

heterocyclic group, R6 is not an alkoxy group, and R6, R7, R8, R9 and R10 are not hydrogen atoms simultaneously.

2. (Once Amended) A photochromic material containing the chromene compound of claim 1, wherein in the group represented by the formula (3) in the above general formula (1):

R6, R7, R8, R9 and R10 are not hydrogen atoms simultaneously,

R6 is a hydrogen atom or an electron attractive group selected from the group consisting of a trifluoromethyl group, a cyano group, a sulfonyl group, an alkylsulfonyl group, an arylsulfonyl group and a nitro group,

when R6 is not a hydrogen atom, each of R7 and R8 is a hydrogen atom, an aliphatic hydrocarbon group having not less than 3 carbon atoms, a fluorine atom, a trifluoromethyl group, a cyano group, a sulfonyl group, an alkylsulfonyl group, an arylsulfonyl group or a nitro group, and

when R6 is a hydrogen atom, each of R7 and R8 is a hydrogen atom.

3. (Once Amended) A photochromic material containing the chromene compound of claim 1 wherein in the group represented by the formula (3) in the above general formula (1):

R6 is a hydrogen atom, an alkoxyl group or a trifluoromethoxy group,

each of R7 and R8 is a hydrogen atom, a halogen atom, a trifluoromethyl group or a trifluoromethoxy group, wherein both R7 and R8 are not hydrogen atoms, when R4 in formula (2) in the general formula (1) is the substituted amino group the substituted or unsubstituted heterocyclic group, or the condensed heterocyclic group, and

both R9 and R10 are hydrogen atoms.

4. (Once Amended) A photochromic optical material containing the chromene compound of claim 1.

5. (Once Amended) A photochromic optical material containing the chromene compound of claim 1.

6. (Once Amended) A photochromic optical material containing the chromene compound of claim 3.

7. (Once Amended) A photochromic polymerizable composition containing the chromene compound of claim 1 and a polymerizable monomer.

8. (Once Amended) A photochromic polymerizable composition containing the chromene compound of claim 2 and a polymerizable monomer is a (meth)acrylic acid ester compound.

9. (New) A photochromic polymerizable composition containing the chromene compound of claim 3 and a polymerizable monomer.

10. (New) The photochromic polymerizable composition of claim 7, further containing a polymerization initiator.

11. (New) The photochromic polymerizable composition of claim 8, further containing a polymerization initiator.

12. (New) The photochromic polymerizable composition of claim 9, further containing a polymerization initiator.

13. (New) The photochromic polymerizable composition of claim 7, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

14. (New) The photochromic polymerizable composition of claim 8, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

15. (New) The photochromic polymerizable composition of claim 9, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

16. (New) The photochromic polymerizable composition of claim 10, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

17. (New) The photochromic polymerizable composition of claim 11, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

18. (New) The photochromic polymerizable composition of claim 12, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.



2002 FEB 19 10/069168

JC13 Rec'd PCT/PTO 19 FEB 2002

**PATENT**

Attorney Docket No. SPO-587/DIV

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: ) Group Art Unit: 1626  
 )  
MOMODA; MATSUOKA; NAGOU ) Examiner: A. SMALL  
 )  
Serial No. unknown )  
 )  
Filed: February 19, 2002 )  
  
For: **CHROMENE COMPOUNDS**

**Appendix C**

Please amend the specification as indicated in the following marked-up copy of the claims.

Page 1

[Title of the Invention]

CHROMENE COMPOUND

CROSS REFERENCE TO RELATED APPLICATION

This application is a divisional of application Serial No. 09/762,112, filed on April 23, 2001, which claims priority from PCT application PCT/JP00/03458 filed May 29, 2000, published in Japanese on December 14, 2000.

1004591453 10/069168

JC13 Rec'd PCT/PTO 19 FEB 2002

**PATENT**

Attorney Docket No. SPO-587/DIV

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: ) Group Art Unit: 1626  
 )  
MOMODA; MATSUOKA; NAGOU ) Examiner: A. SMALL  
 )  
Serial No. unknown )  
 )  
Filed: February 19, 2002 )  
  
For: **CHROMENE COMPOUNDS**

**Appendix D**

Please amend the specification as indicated in the following clean copy of the claims.

Page 1

**CHROMENE COMPOUND**

**CROSS REFERENCE TO RELATED APPLICATION**

This application is a divisional of application Serial No. 09/762,112, filed on April 23, 2001, which claims priority from PCT application PCT/JP00/03458 filed May 29, 2000, published in Japanese on December 14, 2000.